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Ageism in Science: Fair-play between Generations*

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ABSTRACT: T*his paper discusses the role of age in scientific practice from an ethical perspective. In social perception, people tend to categorise others rather automatically along three major dimensions: race, sex, and age.*[1] *Much empirical and theoretical attention has been devoted to the study of racism and sexism, but comparatively little research in the social and behavioural sciences has been directed at understanding what some refer to as the third '-ism':* ageism.[2] *For a serious understanding of the implications of ageism in science, it is necessary to discuss, first, the conflicting relationships between classical and modern concepts of time and calendar age, and thereafter the concept of ageism.*

On time and age

In Western society, Newton's physical time – also called calendar or clock time – plays the role of standard continuum, a frame of reference for other continua of changes such as biological or psychological time. Different concepts of time may have different clocks and time scales, but their scales are always compared with and expressed in terms of calendar time (days, months, years) or clock time (hour, minutes, seconds).

Newton's physical time does not have intrinsic direction; there is no difference between its past orientation (t-) and its future orientation (t+). As such, the classical concept of time violates generally accepted natural laws. Natural phenomena are described by the second law of thermodynamics, which states that chaos or disorder

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will increase *irreversibly* with energetic processes. Thus, the direction of physical time is defined by the irreversible destruction of macroscopic order, or the increase of entropy.

The modern concept of time as linear and irreversible has not changed our conception of calendar age as *additive*, that is, a quantity that can be added, subtracted, multiplied, and divided regardless of the age of the individual or organism. The implication is that all possible calendar ages of the individual are equal. For instance, the first 20 years of life are equal to the middle or last 20 years. Similarly, the first half of an academic career (25 - 45 yrs.) as a junior scientist would be equal to the last half from 45 to 65 years as a senior scientist, which is the mandatory retirement age in most European countries. This, however, makes sense only from a purely clock or calendar time perspective.[3] In the following we will show that different generations in science are not interchangeable and that the mandatory retirement age is built on quicksand.

Ageism

During the past two centuries the place of calendar age has shifted. In comparison with the 19th century, it has assumed surpassing importance, corresponding to a general *quantifying* trend in science. This corresponds to a generally egalitarian norm within society, namely, to treat people independently of personal characteristics – *except for age*.[4] Analogous to sexism, *ageism* can be defined as *the negative stereotyping and discrimination against people solely because of their age.* It should be noted that in this definition no distinction is made between people of different ages. Both young and old people, or younger and older scientists for that matter, may be discriminated against or stereotyped. More common, however, is the definition of ageism as the negative stereotyping and discrimination against *older* people.

Following the latter meaning, ageism is manifested in a wide range of phenomena, on both individual and institutional levels – stereotypes and myths, discriminatory practices in housing, employment, and services of all kinds, intergenerational segregation, education, health care etc. Some of the myths of age include inflexibility, senility, disengagement and unproductiveness. As we will see, gerontological research shows that these stereotypes are spurious – they are based on myths and are contradicted by empirical facts.[5]

Generally, the persistence of ageism is attributed to its roots in basic values, such as the glorification of youth, individualism, economic competition and the reduction of human worth to economic utility. In this context Nelson makes a striking observation:[6] "One of the unique features of ageism is that age, unlike race and sex, represents a category in which most people from the in-group (the young) will eventually (if they are fortunate) become a member of the out-group (older persons). Thus, it seems strange that young people would be prejudiced toward a group to which they will eventually belong. Where does this negative affect originate?" [6 (p. x)]

There are two standard explanations. First, recent research shows that people have multiple, often contradictory views of older persons. Today's elders are seen as incompetent, which is associated with low status, but also as warm, which is associated with a passive attitude.[7] Second, Greenberg, Schimel and Mertens[8] suggest that age prejudice arises from fear of our own mortality; that is, merely thinking about (or seeing) an older person tends to arouse anxiety about the fact that one has a short time on earth, and the fear associated with such cognitions tends to provoke the perceiver to dislike the individual (or group) who elicits such fear. To these accounts a third explanation, based on a special characteristic of human memory, the so-called 'bump' phenomenon should be added.

Autobiographical memory bump

Autobiographical memory can be broadly defined as a type of episodic memory for information related to the self in the form of memories. As such, autobiographical memory obeys generally to classical principles of remembering and forgetting, e.g., the distribution of memories follows a power function, similar to the classic forgetting curve. Contrary to these principles, the *bump* phenomenon represents a disproportional higher recall of memories from the period between the tenth and thirtieth year, as systematically observed in individuals older than approximately 35 years. Peoples' favourite films, music, and books come from this period and they report the most important world events to have originated or occurred in it.[9] As yet, there is no satisfactory explanation for the memory bump, but it may be assumed that the paradoxical peak of memories from between the ages of 10 and 30 years stems from the synchronic action of two life forces, i.e., the force of growth or development, and the force of mortality or aging.[10] The significance of the memory bump can be demonstrated by way of a very simple formula,

$$Pw = C + (20 \pm 10)$$

in which: P = Period (yrs)
w = world-view
C = Cohort (birth)

This formula states that the individual's world-view or frame of reference (Pw) was formed in the period between the ages of 10 and 30 years. For example, in the year 2003 the world-view of a 60-year old scientist or scholar was formed in the historical period between 1953 and 1973. It is the task of cultural historians and sociologists to characterise that period, but one may safely say that the majority of today's 60-year old scientists and scholars experienced or witnessed the student revolution at the end of the sixties while studying.

In the bump period of their life people start dating, have their first relationships, are educated, look for their first job, feel physically strongest, become politically aware, go to the best movies of their life, read the most memorable books, listen to their most loved music, and experience their most intensive learning. In brief, the *bump period* is the *cognitive-affective frame of reference* from which middle-aged and older people view life in general, and relations, work, health and education in particular. No wonder that older generations in science who live and work from this perspective, are stereotyped as unproductive and are discriminated against because of their age.

Generations and ageism in science

The concept of generation often denotes successive groups in time. Generations occur within lineages or descent lines – but not necessarily so. The individual and his/her parents and children comprise three distinct (biological) generations. Similarly, the scientist and his/her mentor and students could be conceived as three generations in science. From a biological perspective the temporal distance between two generations will generally represent a time frame between 20 and 30 years. With the bump formula in mind, it is conceivable that science generations are also 20-30 years apart. This means that at one point in time one could distinguish approximately two generations of scientists who are active in their field, either as a student or junior scientist at the start of his/her career, or as a professor or senior scientist. For the sake of simplicity they are called the young and old generation. The table below shows some ageist stereotypes that younger generations of scientists might have against older scientists (right column), and vice versa (left column).

Ageism between Young and Old Generations in Science

Old against Young	*Young against Old*
- inexperienced	- unproductive
- self-assertive	- inflexible
- impatient	- not creative
- inflated ego	- authoritarian
- threat to one's chair	- career obstacle

It should be noted that the ageist stereotypes are based on the first definition of ageism, which doesn't distinguish between people of different ages, and/or younger and older generations of scientists. The phenomenon, as observed by Nelson,[6] that junior scientists could be prejudiced toward senior scientists, a group to which they will eventually belong, should also be noted. But then, of course, a common feature of these two groups has not yet been mentioned, i.e., their *interdependence*. Both groups depend on each other, just as students need teachers and teachers need students.

The second definition of ageism in science, which concerns the one-sided, negative stereotyping and discrimination against older generations, raises the question whether the interdependence of younger and older generations of scientists is symmetrical or *asymmetrical*. This definition refers to the traditional relationship of the two science generations in terms of master and mate, or – more correctly – professor and student, a distinction that in the final analysis refers to a merit system instead of generational equity.

Generational equity

In our modern welfare state the concept of generational equity has acquired increasing importance. Broadly defined with a view to the scientific community, generational equity means that according to their needs and regardless of their age there is a fair distribution of the available resources among all generations in science. According to this definition, an ethical issue arises when one generation is treated more leniently or generously than another.[11] For example, in some countries loans for college students are subject to means tests for eligibility, but social security entitlements are not.

Generational equity is commonly framed in terms of conflict between young and old and between the working and non-working (or retired) population. The question is whether this concept should be introduced in the scientific community as a remedy for the disease of ageism in science. It can be argued that equity is always morally justified, but then a couple of comments should be added. The first comment concerns the pseudo-additive character of calendar age variables, in this case, the *pseudo-additive* character of the generational variable, as discussed before; that is, generations are interdependent but not interchangeable. The second comment relates to factual information from the behavioural sciences on the life span patterns of *mental abilities*. General intelligence can be divided into two types of mental abilities, i.e., 'fluid' or spatial-analytical abilities, which refer to basic processes of information processing, and 'crystallised' abilities, which refer to cultural knowledge and experience. Both abilities show a rapid rise until early adulthood (ca. 20-25 yrs.), followed by a period of relative stability until the age of 70 for the crystallised abilities, but a slow decline of the fluid abilities after early adulthood. In brief, the pattern of mental abilities is that of differential decline over the life span with a peak for fluid abilities (abstract reasoning) in the bump period between the tenth and thirtieth year, while the crystallised abilities of cultural knowledge and learning experiences continue to increase over time.[5] From the perspective of mental abilities there is no generational equity.

Fair play between generations

In a recent paper, liberally referred to in the following, Drenth[12] discusses the old distinction between quantitative and qualitative methods. *Quantitative* or nomothetic methods are dominant in science and have been very successful, but are also weak in addressing real life problems which are usually characterised by a complex organisational structure. *Qualitative* or ideographic methods, on the other hand, are more suitable for the description of contextual complexity, the detection of patterns of events etc. Gibbons et al.[13] distinguish between Mode 1 and Mode 2 research. Mode 1, that of knowledge production, is described as disciplinary and homogeneous, and the scientific orientation as basically structural/nomothetic. Mode 2 is transdisciplinary and far more heterogeneous in terms of methods and approaches; also descriptive and other qualitative methods of data gathering are allowed.

The quantitative, nomothetic, mode 1 research represents a culture which is not only dominant in the sciences, but often also financially successful; top research is conducted mainly by junior scientists at the peak of their *fluid* abilities. The qualitative, ideographic, mode 2 research, on the other hand, is exemplary of the humanities. This type of research appeals largely to the *crystallised* abilities of scholars and does not provide any direct economic utility. This pattern of differential decline across generations explains why senior scientists – once over the hill at the age of 30 and living on their successes from the bump period – become increasingly obsolete from a short-term, economic perspective (publish or perish, no longer innovative etc., etc.), while the accumulated knowledge and experience of senior scholars allow them to mature until far in their sixties and become even more productive in respect of the analysis of complex historical and social problems .

From the above it seems that junior scientists and older scholars have a clear advantage, and that particularly senior scientists have hardly anything to offer. Such a viewpoint is rather short-sighted for two reasons. First, the older scientist has acquired a wealth of experience, although hardly valued in society, which he or she can pass on to the next generation in the role of *mentor*. Second, in spite of the appearance to the contrary, older people do have an as yet unexplored *potential* for personal and cognitive *growth* that is waiting to be discovered and used in daily life.[10] Fair play between generations in science is more than direct economic utility; in the final analysis it is about the sustainable development and distribution of mental resources among all generations.

Summary and conclusion

This article discusses the role of age and the concept of ageism in scientific practice from an ethical perspective. Different generations in science and the humanities have different strengths and weaknesses as regards their mental abilities over their life span. Older scientists are stereotyped as unproductive, while younger scientists are looked upon as inexperienced. From a short-term, utilitarian perspective, older scientists are generally less valued, but in the long term and in view of their abilities at an older age, they can have a strong impact as a mentor of future generations, a quality completely ignored in modern society as expressed, for example, in the mandatory retirement age of 65. Younger scientists, on the other hand, are highly esteemed for their creative contributions to the economy, but lack experience to put their findings in a broader socio-cultural context. Since traditional relations between younger and older generations of scientists are slowly failing, the extended concept of generational equity is introduced as a remedy for ageism in science, i.e., generational equity relates both to the sustainable development and fair distribution of mental resources among all generations.

In conclusion it is suggested that good scientific practice in research and scholarship should develop a progressive science policy of flexible retirement, continuous education and career development for both young and older scientists and scholars, in brief, *fair play between generations.*

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